

BASEWIDE ENERGY SYSTEMS PLAN  
FOR SHARPE ARMY DEPOT, STOCKTON, CA  
EXECUTIVE SUMMARY  
January, 1982

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## 1.0 - EXECUTIVE SUMMARY

### 1.1 INTRODUCTION

This study represents an Energy Engineering Analysis (EEA). The objective is to develop a plan of projects that will result in the reduction of energy consumption in compliance with the objectives set forth in the Army Facilities Energy Plan (AFEP) without decreasing the readiness posture of the Army. The following items are included as separate documents:

- Executive Summary
- Final Report and Appendices
- Installation Facilities Energy Plan
- Programming Documents - DD Form 1391 and PDB
- Backup Field Audit Data

### 1.2 EXISTING ENERGY CONSUMPTION

The source energy consumption for FY-75 to FY-80 is shown in Table 1-1. The annual basewide energy consumption is shown in Table 1-2. Current and projected energy costs are shown in Table 1-3.

### 1.3 ENERGY CONSERVATION MEASURES DEVELOPED

Because of Sharpe Army Depot's (SHAD) incredibly inexpensive electricity prices, very few energy conservation measures (ECM) are cost effective and economically justifiable. A list of the energy conservation measures investigated is shown in Table 1-4. One project met the Energy Conservation Investment Program (ECIP) criteria (over \$100,000; E/C ratio greater than 14; B/C ratio greater than 1). Eleven projects met the Maintenance, Repair and Minor Construction (MRMC) cutoff (B/C ratio greater than 1). Both types of projects are listed in Table 1-5.

### 1.4 ENERGY PLAN

During the years FY-81 to FY-85 SHAD will experience some growth in energy use because of new buildings. It is assumed that all MRMC projects are implemented by

FY-84 and that the ECIP project starts saving energy in FY-85. Table 1-6 shows the costs and savings of each project. Table 1-7 shows their effect on energy consumption through the year FY-85.

As Table 1-8 indicates, Sharpe Army Depot will probably meet its FY-85 goals for reducing energy consumption by 20% from FY-75 on a BTU per gross square foot basis. However, SHAD will probably not be able to reduce its total annual energy consumption by 25% from FY-75.

Table 1-1  
SOURCE ENERGY CONSUMPTION\*

Fiscal Year	Electricity (KWH)	#2 Fuel Oil (GAL)	LPG (GAL)	Natural Gas (THERMS)
1975	8,328,935	72,627	160,151	171,298
1976	7,884,890	73,984	194,417	138,866
1977	7,643,410	63,174	168,469	101,227
1978	7,947,640	64,280	164,381	94,474
1979	7,922,490	59,567	164,820	115,057
1980	7,773,600	49,756	132,492	105,209

\* Data from records supplied by Sharpe personnel.

Table 1-2  
ANNUAL BASEWIDE ENERGY CONSUMPTION\*

Fiscal Year	Electricity (10 <sup>9</sup> BTU)	#2 Fuel Oil (10 <sup>9</sup> BTU)	LPG (10 <sup>9</sup> BTU)	Natural Gas (10 <sup>9</sup> BTU)	Total (10 <sup>9</sup> BTU)
1975	96.6	10.1	15.3	17.7	139.7
1976	91.5	10.3	18.5	14.3	134.6
1977	88.7	8.8	16.1	10.4	124.0
1978	92.2	8.9	15.7	9.7	126.5
1979	91.9	8.3	15.8	11.9	127.9
1980	90.2	6.9	12.7	10.8	120.6

\* Data is converted from Table 1-1 using the following factors:

Electricity, 11,600 BTU per KWH  
 Fuel oil, 138,700 BTU per gallon  
 LPG, 95,500 BTU per gallon  
 Natural gas, 100,000 BTU per therm

Table 1-3  
SHAD ENERGY COSTS

Energy Type	Present (FY-82) Unit Costs	Future (est., FY-85)*	
		Unit Costs	\$ per 10 <sup>6</sup> BTU
Electricity			
• Use	\$.0116 per KWH	\$.0167 per KWH	1.44
• Demand	\$2.00 per KW	\$2.89 per KW	-
Natural Gas	\$.463 per therm	\$.686 per therm	6.86
Propane (LPG)	\$.66 per gallon	\$.978 per gallon	10.24
#2 Fuel Oil	\$1.37 per gallon	\$2.03 per gallon	14.64

\* Electrical costs escalated at 13% per year (Ref. 26).  
Fossil fuel costs escalated at 14% per year (Ref. 26).

Table 1-4  
POSSIBLE ENERGY CONSERVATION MEASURES

Replace lighting fixtures
Insulate warehouses
Energy monitoring and control systems
Replace steam unit heaters with infra-red heaters
Install insulation on water heaters
Attic insulation
Install thermostatic control valves
Disconnect transformers
Insulate piping
Replace gas furnace pilots
Install electric unit heaters
Install damper controls

Table 1-5  
PROJECT SUMMARY

Item	Description
ECIP-1	Replace light fixtures
M-1	Install electric unit heaters - Bldg. 585
M-2	Attic insulation - family housing buildings
M-3	Insulate steam and condensate piping - Bldg. 404, section 1
M-4	Install thermostatic control valves on convectors, radiators, and baseboard heating radiators
M-5	Install domestic water heater, circulating pump and piping - Bldg. 75
E-20	Relamp Bldgs. T-648 and T-661 with energy-saving lamps
M-6	Replace standing pilots with electric ignition pilots on gas-fired units - various buildings
E-21	Disconnect distribution transformers on pole SB-11
M-7	Install blanket insulation on all gas water heaters - all family housing
M-8	Replace standard pilots with electric ignition pilots on gas furnaces - all family housing
M-9	Install return air ducts and damper control - Bldg. 655

Table 1-6  
PROJECT DATA

Item	Cost (\$)	Energy Savings (10 <sup>6</sup> BTU)	E/C	B/C
ECIP-1	163,000	8,900	55	1.3
M-2	7,498	527	70	4.3
M-3	4,423	189	43	2.6
M-1	4,589	128	28	2.5
M-7	2,643	90	34	2.1
M-6	17,954	391	22	1.9
M-4	20,945	312	15	1.8
M-5	6,806	289	43	1.7
E-20	439	56	113	1.4
E-21	3,675	429	103	1.3
M-8	6,014	132	22	1.3
M-9	16,671	349	21	1.3

Table 1-7  
ESTIMATED ENERGY CHANGES

FY	Change	Amount (10 <sup>6</sup> BTU)	Result (10 <sup>6</sup> BTU)
80	-	-	120,600
81	None	-0-	120,600
82	New buildings	+200	120,800
83	New buildings	+1,300	122,100
84	MRMC savings	-2,900	119,200
85	ECIP savings	-8,900	110,300



Table 1-8  
FUTURE ENERGY CONSUMPTION (est.)

Fiscal Year	Total Use (MMBTU)	Building Area* (sq. ft.)	Average Use (BTU/sq. ft.)	Decrease Since FY-75
1980	120,600	3,000,000	39,900	14.2%
1981	120,600	3,000,000	39,900	14.2%
1982	120,800	3,000,000	40,000	14.0%
1983	122,100	3,000,000	40,400	13.1%
1984	119,200	3,000,000	39,500	15.1%
1985	110,300	3,000,000	36,500	21.5%
1985 goals	104,800		37,300	20.0%

\* gross square feet